Winter crop evaluation for silage and forage quality in Korea

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Introduction

Winter crops of rye, barley, oats and Italian ryegrass are used alone or combined as silage crops or green forage in autumn and spring in Korea. The production and utilization of winter crops have been increasing since 2000, because of high yield and double cropping potential in the rice field after harvesting rice. An advantage of these winter crops is that they are produced in the cool season. However, a main problem in making silage with these winter crops is that they are sometimes poor in quality for various reasons.

Therefore we conducted a survey of farms and forage selling cooperatives, on forage and silage quality for the last five years.

Methods

We collected 475 silage samples from farms and forage selling cooperatives, on forage and silage quality for the last five years.

Results and Discussion

The results were summarized in Table 1. The moisture, NDF, ADF, NFC, TDN, RFQ, lactic acid, and total organic acid have significant differences among winter crop silage (P<0.05). However, there were no significant differences in other chemical composition (CP, Ash, pH, acetic acid (ACE) and butyric acid (BUT)). The RFQ (relative feed quality) value of barley was higher than that of other crops because of high NFC and TDN contents, and lower NDF and ADF contents. Lactic acid and total organic acid of IRG were also higher than those of other winter crops. This experiment indicates that lactic acid of the silage was good indicator for evaluation of whole crop barley silage. Differences in forage quality were also observed among winter silage crops.

Conclusions

Differences in forage quality were observed among winter silage crops. Barley had the highest forage and silage quality among winter crops. This experiment indicates that lactic acid of silage was good indicator for evaluation of winter crop quality. Oats and Italian ryegrass were good for winter silage crop in term of TDN, CP, and lactic acid.

Table 1. Comparison of silage quality in winter crops (% of dry matter basis)

<table>
<thead>
<tr>
<th>Winter crops</th>
<th>Moisture</th>
<th>NDF</th>
<th>ADF</th>
<th>NFC</th>
<th>TDN</th>
<th>RFQ</th>
<th>LAC</th>
<th>ORG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rye</td>
<td>58.6 ab</td>
<td>62.6 ab</td>
<td>40.2 a</td>
<td>21.1 b</td>
<td>57.2 b</td>
<td>109 b</td>
<td>1.89 b</td>
<td>2.60 b</td>
</tr>
<tr>
<td>Italian ryegrass</td>
<td>55.5 c</td>
<td>60.6 b</td>
<td>38.6 a</td>
<td>23.3 b</td>
<td>57.5 b</td>
<td>108 b</td>
<td>2.71 ab</td>
<td>3.36 ab</td>
</tr>
<tr>
<td>Barley</td>
<td>64.3 a</td>
<td>53.5 c</td>
<td>34.3 b</td>
<td>29.7 a</td>
<td>61.5 a</td>
<td>130 a</td>
<td>3.30 a</td>
<td>4.43 a</td>
</tr>
<tr>
<td>Oats</td>
<td>58.8 ab</td>
<td>65.2 a</td>
<td>41.5 a</td>
<td>19.9 b</td>
<td>55.8 b</td>
<td>102 b</td>
<td>3.19 a</td>
<td>3.82 ab</td>
</tr>
</tbody>
</table>

NDF=neutral detergent fiber, ADF=acid detergent fiber, NFC=non-fiber carbohydrate, TDN=total digestible nutrients, RFQ=relative forage quality, LAC=lactic acid, ORG=total organic acid.

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Advances in forage conservation to improve quality
References


